Assignment 2: Transformations & Tone Mapping

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Exercises solved:
We solved all three exercises.
Exercise 1: Implemented plane-ray intersection and added 6 planes as a "box" to the scene.
Exercise 2: Implemented cone-ray intersection (closed cone), implemented transformations. Placed the two cones accordingly.
Exercise 3: Updated lighting – tone mapping, gamma correction, attenuation; Played around with parameters to inspect what they change in the final rendering.

Encountered problems:

Exercise 1: none

Exercise 2: First, we had some trouble with completely understanding the theoretical foundations. After revising them, the implementation was successful. We implemented the closed cone intersection by first intersecting the plane, then checking if the intersection is within the cone's radius. After that, we compute the cone surface intersection. If both intersections occur, we compare them and choose the intersection closer to the camera. Ordering all operations was challenging but worked out nicely.

Exercise 3: After implementing the lighting, all colors in the image were much weaker. We played around with the parameters in the tone mapping and attenuation, as well as the ambient light to improve the image quality. We reduced the ambient light and increased the three light sources. The largest impact had the changing of the materials' diffuse and ambient values. Because of the reduced color intensity, we used brighter colors to improve the overall visual result. We tried to achieve more brightly displayed colors while keeping the 'old' color values, but had little success.

Declaration of AI use: We created a header file with color names and their corresponding RGB values. This list of colors was created with ChatGPT. No other code was created with AI or similar tools.